

## In the Claims

Amend the claims as follows:

-- 1 (Currently Amended). A method of estimating a communication path formed of a plurality of channels, associated with a plurality of antennae, the method necessitating an estimate of the impulse response  $C_1, C_2, \dots, C_n$  of said channels, ~~characterized in that it includes the following steps comprising the steps of:~~

- acquiring a space statistic of the ~~transmission~~ communication path,
- establishing a corrected impulse response ( $C'_1, C'_2, \dots, C'_n$ ) at least by weighting said impulse response estimates ( $C_1, C_2, \dots, C_n$ ) by means of said space statistic and an estimate of the additive noise ( $N_{01}, N_{02}, \dots, N_{0n}$ ) of said channels.

-- 2 (Currently Amended). A method according to claim 1, ~~characterized in that~~ wherein said space statistic corresponds to an estimate of the correlation of said communication channels taken two by two.

-- 3 (Currently Amended). A method according to claim 2, ~~characterized in that~~ wherein said estimate of the correlation of the communication channels takes the form of a space correlation matrix ( $G$ ) in which the element ( $g_{ij}$ ) in the  $i$ th row and the  $j$ th column is obtained by smoothing the product ( $C_i^h C_j$ ) of the Hermitian transposition of the estimated impulse response ( $C_i$ ) of the  $i$ th channel and the estimated impulse response ( $C_j$ ) of the  $j$ th channel.

-- 4 (Currently Amended). A method according to claim 3, ~~characterized in that~~

wherein if a signal S received by a channel corresponds to a transmitted training sequence the estimate of the additive noise ( $N_0$ ) of that channel is obtained by normalizing the energy of the vector ( $S - AC_1$ ) where A is the measurement matrix associated with said training sequence.

-- 5 (Currently Amended). A method according to claim 4, ~~characterized in that~~ wherein said normalization is followed by an averaging step.

-- 6 (Currently Amended). A method according to any of claims 3 to 5, ~~characterized in that~~ wherein if a noise matrix (N) is formed from the estimated additive noise ( $N_{01}, N_{02}, \dots, N_{0n}$ ) of the channels and a space-weighting matrix ( $G'$ ) is defined on the basis of said spatial correlation matrix (G) and said noise matrix  $G' = G(G + N)^{-1}$ , said corrected impulse responses ( $C'_1, C'_2, \dots, C'_n$ ) are obtained from the following expression:

$$\begin{pmatrix} C'_1{}^t \\ C'_2{}^t \\ \cdot \\ \cdot \\ \cdot \\ C'_n{}^t \end{pmatrix} = G' \begin{pmatrix} C_1{}^t \\ C_2{}^t \\ \cdot \\ \cdot \\ \cdot \\ C_n{}^t \end{pmatrix}$$

-- 7 (Currently Amended). A method according to ~~any of claims 1 to 6, characterized in that~~ claim 6 wherein, if the signal (S) received by a channel corresponds to a transmitted training sequence, the method includes the following steps before establishing said corrected impulse response ( $C'_1$ ) of that channel:

- acquiring a time statistic of the transmission channel,
- establishing the estimate ( $X_p$ ) of the impulse response ( $C_1$ ) of said channel, which estimate is weighted by said time statistic of the channel by means of said received signal ( $S$ ).

-- 8 (Currently Amended). A method according to claim 7, ~~characterized in that~~ wherein said time statistic corresponds to an estimate of the covariance of said impulse response.

-- 9 (Currently Amended). A method according to claim 8, ~~characterized in that it~~ includes the following steps comprising the steps of:

- smoothing said impulse response and orthonormalizing by means of a transformation matrix  $W$  to obtain said estimate of the covariance which then takes the form of a matrix  $L'$ ,
- seeking eigenvectors ( $v_i'$ ) and eigenvalues ( $\lambda_i'$ ) associated with that matrix  $L'$ ,
- estimating the instantaneous impulse response of the channel from said received signal ( $S$ ) and applying that transformation matrix  $W$  to form a vector  $X'$ , so establishing said weighted estimate ( $X_p$ ):

$$X_p = \sum \left( \frac{\lambda_i' - N_0}{\lambda_i'} (v_i'^h \cdot X') \right) W v_i'^h$$

where  $N_0$  is a positive real number representing the additive noise of said channel.

-- 10 (Currently Amended). A method according to claim 9, ~~characterized in that~~ wherein said additive noise ( $N_0$ ) is made equal to the smallest of said eigenvalues ( $\lambda_i'$ ).

-- 11 (Currently Amended). A method according to claim 9 ~~or claim 10, characterized~~

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~~in that~~ wherein each eigenvalue of a subset of said eigenvalues ( $\lambda_i$ ) having a contribution less than a predetermined threshold is forced to the value of said additive noise ( $N_0$ ).

-- 12 (Currently Amended). A method according to claim 8, ~~characterized in that~~ wherein said estimate of the covariance takes the form of a matrix R and said weighted estimate ( $X_p$ ) is established as follows:

$$X_p = (A^t A + N_0 R^{-1})^{-1} A^t . S$$

where A is the measurement matrix associated with said training sequence and  $N_0$  is a positive real number representing the additive noise of said channel.

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-- 13 (Currently Amended). A method according to claim 12, [characterized in that it includes] comprising a step of orthonormalizing said matrix R by means of a transformation matrix W to obtain a new matrix R', the weighted estimate then taking the following new form:

$$X_p = W^t (I + N_0 R'^{-1})^{-1} W^t A^t . S$$

where the matrix A' is equal to product of the transformation matrix W and said measurement matrix A.

-- 14 (Currently Amended). A method according to claim 13, [characterized in that] wherein the expression  $(I + N_0 R'^{-1})^{-1}$  is calculated by means of the matrix inversion lemma.

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